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Its contour is rather irregular, and it is about 6′ x 4′ in size. Its most striking feature is the roughly circular protuberance seen at the lower right hand (southwest) corner. Here the edges are defined with almost perfect sharpness, and there is an astonishingly abrupt transition from the background of faint stars so closely packed that they seem almost a continuous sheet, to a region absolutely blank. At this point it really seems as tho one could "see" the sharp edge of the dark nebula. On its eastern edge the transition is somewhat less abrupt. The coarse cluster of bright stars to the east (left) of this striking object serves to accentuate the beauty of the region.

It is impossible to look at the original negatives of these interesting objects and not be convinced that there is something dark between us and the general background of stars; I firmly believe that these are actual "dark nebulae." Perhaps spectroscopic studies of stars involved in diffuse nebulae which show such occulting effects in their peripheral regions may some day enlighten us as to the actual nature of whatever it may be which composes the dark nebulae. That they are "holes" torn in the star fabric of the Milky Way by some rapidly rushing star-cluster is difficult to believe, when one studies carefully the sharply defined edges. If merely "holes," we must assume their age as of the order of hundreds of millions of years, in which time, as Dr. Campbell has pointed out, the random motions of the stars in the neighborhood would long since have obliterated the clear-cut edges, if not the "hole" itself.

January, 1918. HEBER D. CURTIS.

WIRELESS TIME SERVICE IN THE PHILIPPINE ISLANDS

The progress in the time service of the Philippine Islands is made evident from the fact that since October 1, 1917, the Cavite Radio Station co-operating with the Bureau of Posts and the Manila Observatory sends out time signals of the 120th meridian East of Greenwich at 11 A. M. and 10 P. M. every day, Sundays and holidays inclusive. The establishment of a wireless time service in the Philippine Islands had been strongly urged by the undersigned in many conversations with members of the observatory staff and officers of the American Navy. Manila holds an enviable position in the Pacific and the interests of shipping companies making Manila a port of call are too prosperous to be overlooked. Accurate time signals and wise typhoon warnings are of immense value to the units of the United States Asiatic Fleet, to army transports and in general to oversea shipping.

Meridian transits of stars are observed at the Manila Observatory with a Repsold transit instrument of 1913 pattern. The diameter of the objective is 7.5 cc. and its focal length about 80 cc.: the micrometer is provided with eleven fixed and three movable wires. Both Riefler clocks, sidereal and civil, keep an excellent rate. For the purpose of sending time signals, the transmitting clock of the Manila Observatory is connected with the Cavite Wireless Station thru the Bureau of Posts. Manila Observatory time signals begin at 10:55 A. M. and 9:55 P. M., standard time of the 120th meridian East of Greenwich; and continue for five minutes. During this interval every tick of the clock is transmitted, except the 28th, 29th, 54th, 55th, 56th, 57th, 58th and 59th of each minute. While the preliminary tests on the whole system of sending time signals by wireless were being conducted, I listened to the time signals myself on board the U. S. cruiser Wilmington, the U. S. moniter Monterey, the U. S. A. T. Sheridan and Merritt, and the Colombia of the Pacific Mail. It gave a special feeling of satisfaction to hear on board these vessels clearly and distinctly the ticks of the observatory pendulum. The high power Cañacao station pending completion, the radio transmission is by a 5 kw. spark set on a wave-length of 952 meters. I firmly believe that the day is not far off when every vessel plying between the North Pacific Coast and the Far East will be in a position to receive daily time signals by wireless, either from Mare Island or from Manila Observatory thru Cañacao Naval Station.

Manila Observatory. M. SELGA, S. J.

THE SPECTRUM AND RADIAL VELOCITY OF THE SPIRAL NEBULA N. G. C. 4151

One of Dr. Curtis's photographs with the Crossley reflector, tho taken for a different purpose, recorded the image of the nebula N. G. C. 4151 (R. A. = $12^h\ 5^m.5$, Dec. = $+39^\circ\ 58'$) near one edge of the plate. The strong nucleus and the elliptic outline of a faint ring apparently symmetrical with reference to the nucleus suggested strongly that this object is in fact a planetary nebula. Its spectrum was accordingly observed visually by us in the expectation that we should find the well-known green nebular bright lines to be